The Cryosphere Discuss.,
doi:10.5194/tc-2016-170-RC1, 2016

The Cryosphere Discussions

Interactive comment on "Recent geodetic mass balance of Monte Tronador glaciers, North Patagonian Andes" *by* Lucas Ruiz et al.

Anonymous Referee #1

Received and published: 3 October 2016

General Comments: The submitted manuscript presents an important study of the surface mass balance of Andean glaciers on Monte Tronador, in a region where a dearth of such data exist. If anything, this manuscript delves into the lack of data in the area and the need for more measurements as outlined in the discussion and conclusions. Further, the manuscript demonstrates that DEM differencing method can be used in a region with limited available data to determine elevation change, and also, importantly, demonstrates the limitations of this method. The discussion of the methodology, particularly the discussion of the error propagation in the methods used, is very thorough, and appreciated. There are a number of minor technical errors/typos that should be addressed to improve readability.

Technical Comments:

Abstract, line 10: Should be, "...little is known" not "little it is known..."

Page 1, Line 27: "over at a period" should be" over a period"

Page 1, Line 28: "that spans from a few years..." instead of "that spans from few years..."

Page 1, Line 29, "measure the contribution of glaciers to sea level rise..."

Page 2, Line 3: Due to difficulties sustaining...

Page 2, Line 7: Not sure if the authors are trying to say that the lack of information about small glaciers hampers complementing the larger data set that covers the wider region?

Page 2, Line 15: "Owing to its discontinuous spatial coverage, the X-band SRTM has not been as widely used for glacier elevation change studies as the C-band SRTM has been (Neckel et al., 2013; Rankl and Braun, 2016)." This statement begs the question of why it is ok to use in this particular study, it might be good to add a phrase to qualify that here????

Page 3, Line 1: "Meanwhile, Parra and Vuriloches were designated as a unique glacier (No Name 1) by that same study." This statement is a little confusing, do the authors mean, "Meanwhile, Parra and Vuriloches were designated as a single glacier (No Name 1) by that same study." ?

Page 3, Lines 3-10: Are all of these glacier dynamics outlined in Ruiz et al., 2015? If yes, I would add a statement along the lines of, "as outlined in Ruiz et al., 2015, ..." in order to properly cite these data.

Page 3, Line 23: " and due to a narrower ground track.." or "and due to its narrower ground track..." not "and due to his narrower ground track..." There is also something a little confusing about this phrase, which is why I suggest adding "and" but not sure if that is the intention of the authors.

Page 3, Line 27: “scientific proposes” should be “scientific purposes”

Page 3, Line 29: “Penetration of the radar signal into snow and ice is related to their physical parameters” should be “Penetration of the radar signal into snow and ice is related to snow and ice physical parameters. . .”

Page 4, line 22, delete extra parenthesis in front of Gardelle et al. (after “e.g.”)

Page 5, line 5, should be “for extreme values of the curvature” instead of “extremes values”

Page 5, line 7, “mid-Februarys” should be “mid-February”

Page 5, line 17, should “voids pixels” be “void pixels”?

Page 6, line 2, should be, “resolves the edge of the cliff more sharply”

Page 6, line 3, not sure what “the lower reaches of the Castano Overa is quite small” refers to? Is it that “the area of the lower reaches of the Castano Overa is quite small in comparison to the total area”?

Page 6, line 13, I think that “it” should be “its” in front of altitude band

Page 6, line 19, should be “number of independent values”

Page 6, line 25, Ai should be defined

Page 7, line 4, I’m not sure what, “The assumption density error represents a 16% error.” I think it means, “The assumption of a density of 850 kg m-3 represents a 16% error.” Or “The assumption of a density value represents a 16% error.”

Page 9, line 11, suggest putting “i.e.” in front of “curvature correction”

Page 9, line 15, Should be, “Our mass balance error. . .is in the same range. . .” not “are in the same range”

Page 10, line 5, AAR should be defined

Page 11, line 4, “their” should be “its” as it is referring to “the snout of the Verde glacier”

Page 11, line 25, should be “the icefield-wide mass balance is. . .” not “are” (or could be, probably more correctly, “the icefield-wide mass balances for the two icefields are, respectively, are. . .”

Page 12, line 17, not sure what “the longest and detail length fluctuation series available in the North Patagonian Andes” means. Is it, “the longest and most detailed length fluctuation series available in the North Patagonian Andes”?

Figure 1: hard to see the blue lines differentiating the glaciers vs. some of the features which are also blue-ish. What is the white line? Looks like it is marking the bedrock step zones, but that should be specified in caption.

Figure 3 and Figure 4: It would be clearer if the blue and green data are identified as the hysometry data and the grey data are identified as the area data. . .as it is, it is not completely clear which data are which unless the reader ponders the figure for a little bit Should be written, “all plots have the same scale and are sorted in glacier size in descending order”

Figure 4. The label “data” is not very helpful, maybe put “off- glacier and –forest pixels” instead

Table 3.”La Almohadilla is the closest temperature records to Monte Tronador” should be ” La Almohadilla is the closest temperature record to Monte Tronador” and ” Los Alerces the closest precipitation records to Monte Tronador.” Should be Los Alerces the closest precipitation record to Monte Tronador.

Page 25, line 9, should define B as the glacier mass balance in this line

---

Interactive comment on The Cryosphere Discuss., doi:10.5194/tc-2016-170, 2016.